

## Supporting information for

Trihexyltetradecylphosphonium chloride based ratiometric fluorescent nanosensors for multiplex  
anion discrimination

Yueling Liu <sup>a,b</sup>, Jianhua Fan <sup>a,b</sup>, Ni Zhang <sup>a</sup>, Huiying Xu, <sup>a</sup> Wei Su <sup>a</sup>, Yu Qin <sup>c</sup>, Dechen Jiang <sup>c,\*</sup>

<sup>a</sup>State Key Laboratory of Bioreactor Engineering, School of Biotechnology, East China University  
of Science and Technology, Shanghai 200237, P. R. China

<sup>b</sup>Department of Applied Biology, East China University of Science and Technology, Shanghai  
200237, P.R. China

<sup>c</sup>State Key Laboratory of Analytical Chemistry for Life science, School of Chemistry and  
Chemical Engineering, Nanjing University, Nanjing, 210093, P.R. China

\*E-mail: dechenjiang@nju.edu.cn (D. J). Tel/Fax: 0086-25-83594846.

### Contents

**Figure S1.** Chemical structures

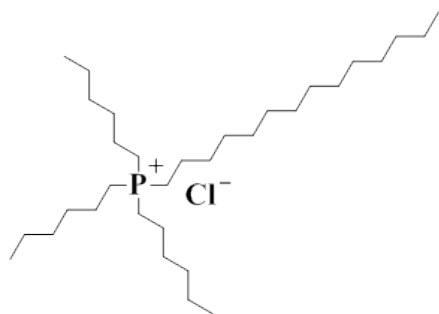
**Figure S2.** Fluorescence spectra of nanosensor without ionophore

**Figure S3.** Fluorescence spectra of nanosensor with ETH9033

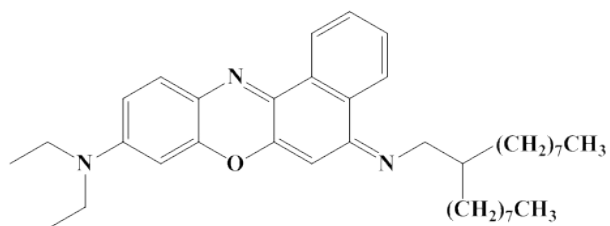
**Figure S4.** Absorbance spectra and selectivity of nanosensor with ETH9033

**Figure S5.** Fluorescence spectra of nanosensor with ETH9009

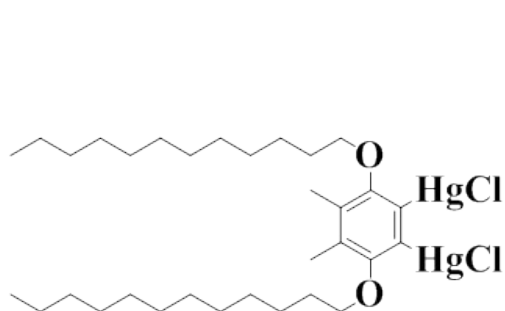
**Figure S6.** Absorbance spectra and selectivity of nanosensor with ETH9009



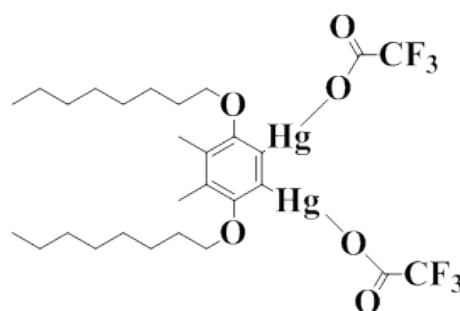
Trihexyltetradecylphosphonium chloride  
([THTP][Cl])



chromoionophore III (ETH5350)

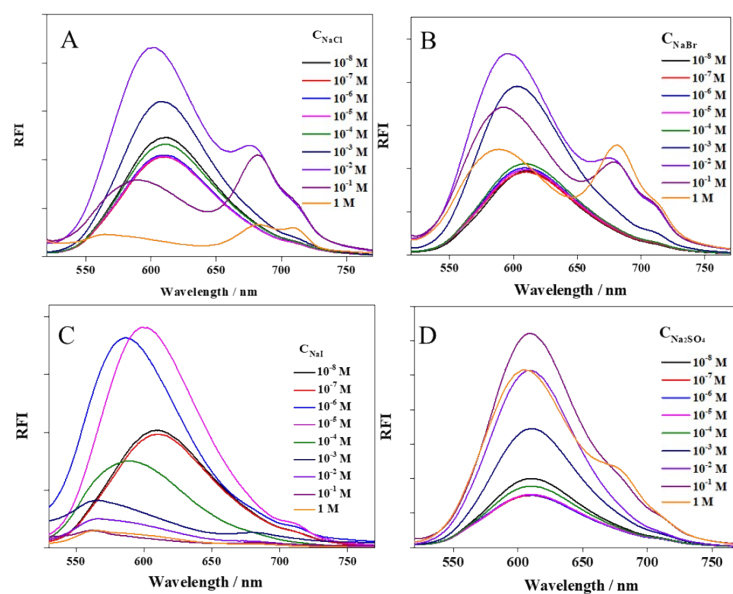


ETH9033

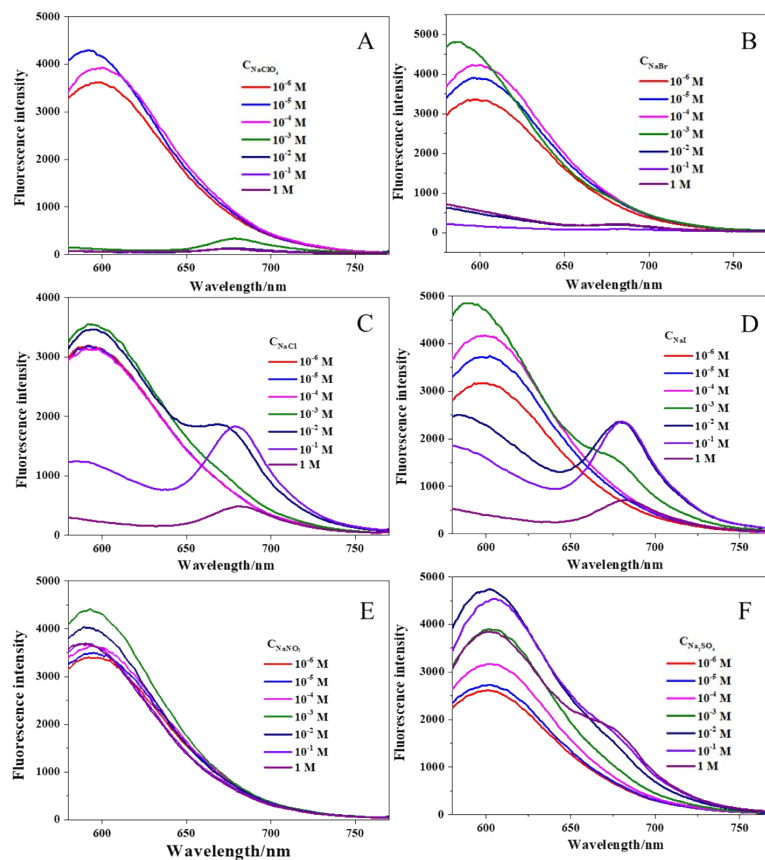


ETH9009

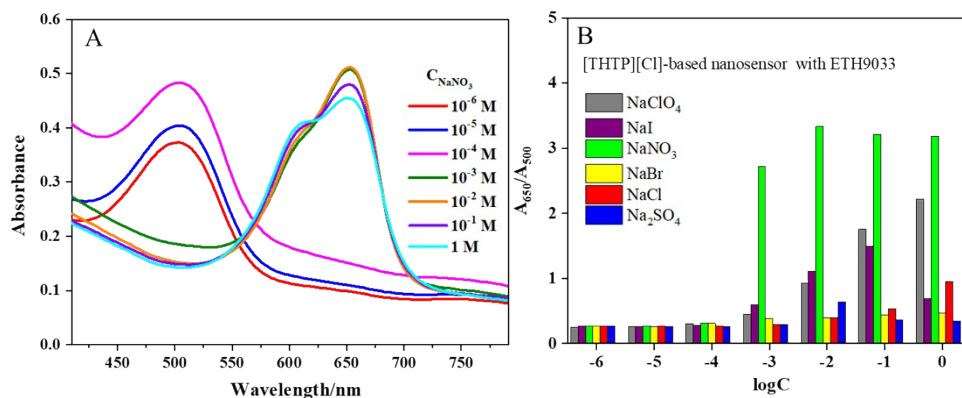
**Figure S1.** Chemical structures of trihexyltetradecylphosphonium chloride ([THTP][Cl]), chromoionophore III (ETH5350), ETH9033 and ETH9009.



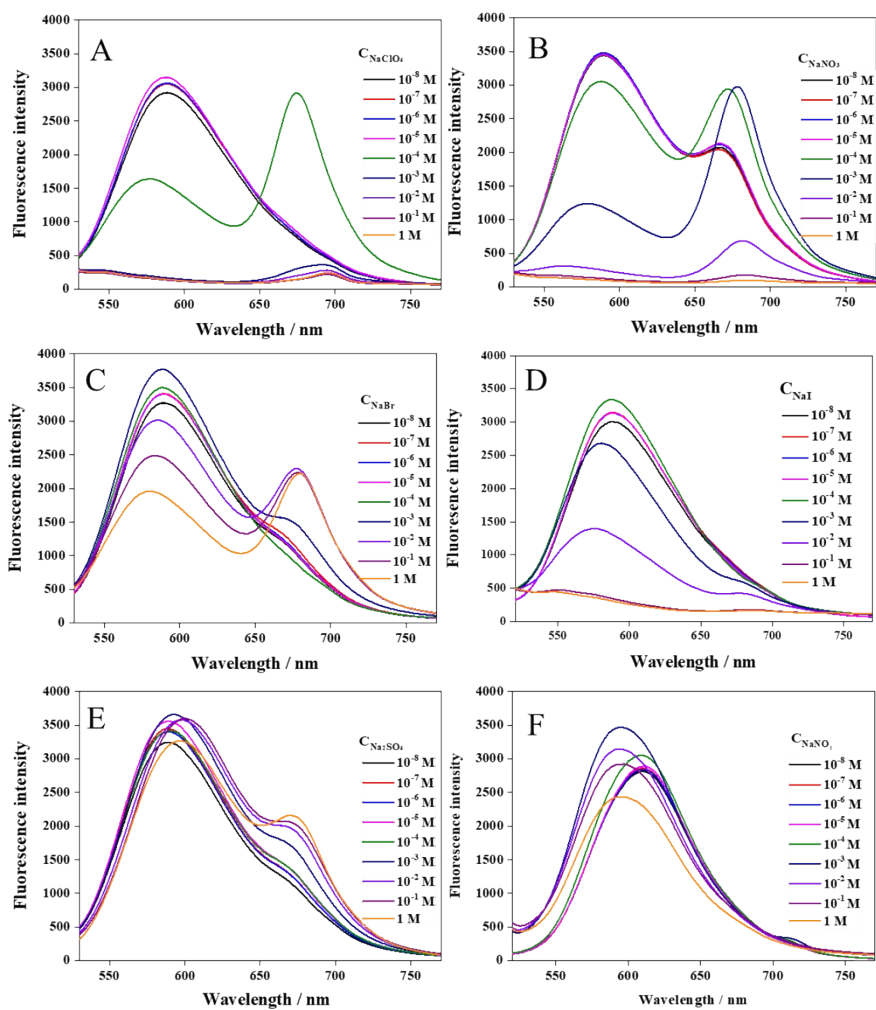
**Figure S2.** Fluorescence spectra of the [THTP][Cl]-based nanosensors without ionophore for different anions including of NaCl (A), NaBr (B), NaI (C) and Na<sub>2</sub>SO<sub>4</sub> (D) with concentrations from  $10^{-8}$  to 1 M.



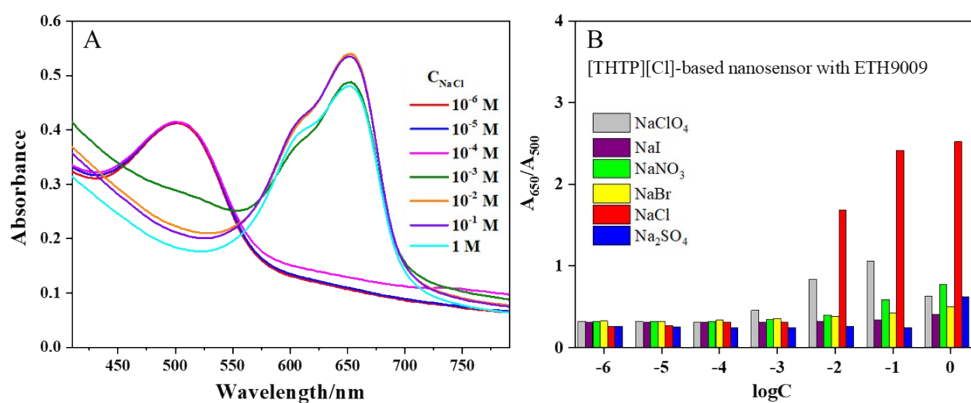
**Figure S3.** Fluorescence spectra of the [THTP][Cl]-based nanosensors with ionophore ETH9033 for different anions including of NaClO<sub>4</sub> (A), NaBr (B), NaCl (C), NaI (D), NaNO<sub>2</sub> (E) and Na<sub>2</sub>SO<sub>4</sub> (F) with concentrations from 10<sup>-6</sup> to 1 M.



**Figure S4.** (A) Absorbance spectra for NaNO<sub>3</sub> and (B) absorbance ratios of  $A_{650}/A_{500}$  versus the logarithm values of anion including NaClO<sub>4</sub> (grey column), NaI (purple column), NaNO<sub>3</sub> (green column), NaBr (yellow column), NaCl (red column) and Na<sub>2</sub>SO<sub>4</sub> (blue column) in the range from 10<sup>-6</sup> to 1 M for the [THTP][Cl]-based nanosensor with ETH9033.



**Figure S5.** Fluorescence spectra of the [THTP][Cl]-based nanosensors in the presence of ionophore ETH9009 for different anions including of  $\text{NaClO}_4$  (A),  $\text{NaNO}_3$  (B),  $\text{NaBr}$  (C),  $\text{NaI}$  (D),  $\text{Na}_2\text{SO}_4$  (E) and  $\text{NaNO}_2$  (F) with concentrations from  $10^{-8}$  to 1 M.



**Figure S6.** (A) Absorbance spectra for NaCl and (B) absorbance ratios of  $A_{650}/A_{500}$  versus the logarithm values of anion including NaClO<sub>4</sub> (grey column), NaI (purple column), NaNO<sub>3</sub> (green column), NaBr (yellow column), NaCl (red column), and Na<sub>2</sub>SO<sub>4</sub> (blue column) in the range from  $10^{-6}$  to 1 M for the [THTP][Cl]-based nanosensor with ETH9009.